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tity. According to this definition every alternating group whose degree exceeds 3 is complete, while none of these groups is complete according to the definitions of this term given elsewhere. A still more original and more mysterious definition under this term relates to the regular group. It is stated that this is "a transitive group whose order is the same as that of the letter on which it is made."

It is very difficult to see how any one can discover any meaning whatever in such a definition. To make a group on a letter is a process which seems to have been foreign to the literature of this subject. A large number of almost equally vague statements occur under other terms. For instance, under the term *number* it is stated that an irrational number is "a definite number not expressible in a definite number of digits," and a congruence group is defined as a group made up of replacements.

It may probably be assumed that all mathematicians who read these few citations will agree that American mathematicians have good reason to protest against such a butchery of their subject in a popular work of reference. Those who desire more evidence can easily obtain it by consulting this dictionary for the definitions of the following terms: analogy, angle—especially angle of elevation and angle of depression, automorphic, fraction, matrix, mathematical and variable.

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A REPLY TO DR. HERON'S STRICTURES

THE all-too-familiar "blessings" of Professor Karl Pearson upon "Mendelians" have recently been continued by his understudy, Dr. David Heron, and directed toward American work in eugenics in general and that of the undersigned in particular. Like my colleagues in this country I should have remained silent under the attacks, knowing that discriminating men of science in this country as well as in England recognize their true animus and that they lie outside the pale of science. But the notoriety given in a daily paper to the publication of Heron and to a

"defence" based upon an interview with me by a reporter of the paper lead me to make a brief reply.

I shall not attempt now to answer all the scores of trivial points of criticism made by Dr. Heron, but shall consider only the paper on heredity of epilepsy by Dr. David F. Weeks and myself, which he singles out for special attack. The numerous "errors" to which he calls attention fall for the most part into three categories, based on misunderstanding so gross on the critic's part as to render it difficult to believe that they are not intentional. First, Dr. Heron seems to assume that whenever a symbol in a pedigree chart is not accompanied on the chart by some special description it stands for a person about whom nothing is known. He calls attention to numerous cases where, notwithstanding, the corresponding individual is described in the text. The assumption is a gross error. The chart shows mainly the interrelationship of individuals and indicates only certain traits. Second, Dr. Heron catalogues, with infinite pains, "errors" in citing the case number. Here he has fallen into a trap which the authors unconsciously prepared for him. To avoid the possibility that a person who is not authorized should connect an individual at the institution with his family history it was decided to apply alterations to the case numbers which enable the authors, but not the ordinary reader, to identify the case. None of the "errors" are such as would prevent the use of the numbers by the authors and they could be of no scientific use to others. Dr. Heron used them merely for criticism. Had we anticipated that there was anywhere a man of science with such abundant leisure, we should have published a warning that the reference numbers were for the sake of identification by the authors and not for scientific study. Third, in our tables we analyzed the traits of the "children" into ten columns, but condensed those of the father's sibs, etc., into 5 columns to save space; in some cases father and father's sibs, etc., appear as "children" and the classification is accordingly expanded from 5 to 10 categories. This, of course, is obvious to any intelligent

reader; but it serves our critic to swell the accumulation of details for his contention that our work is careless because the same fraternity is described by the use of different words in different parts of the paper.

A critic who is guilty of such extensive stupid, captious and misleading criticism can hardly expect a scientific consideration of other points he raises of a more general sort. I fear it will be futile for a biologist to attempt to show to the "applied statistician" his errors. Genuine, scientific criticism has always been useful in the advancement of science, but friends of Galton must regard it as a tragedy that the fortune of one of the largest-minded and most fertile-minded men of science should be supporting a laboratory one of whose leading members spends much time making elaborate researches into his delusions concerning the blunders of others instead of making positive discoveries in a field where so little is known and where the need of utilizable knowledge is so great.

CHAS. B. DAVENPORT

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SCIENTIFIC BOOKS

Mineral Deposits. By WALDEMAR LINDGREN.
New York, McGraw-Hill Co. Pp. v + 883,
Figs. 257. 8vo. \$5.00.

In the preparation of this invaluable treatise a great boon has been conferred by Professor Lindgren upon all geologists. The work is of interest not alone to those immediately engaged in mining, but to all who are concerned with the processes of mineral solution and deposition in the earth's crust. For those who have not followed from year to year the advances of observation and interpretation, many new and striking results will appear.

The author has brought exceptional preparation and experience to the task. An old Freiburger, he was grounded by one of the best of teachers, the late Professor A. W. Stelzner, in the "*Lehre*" or "lore" of ore-deposits, and learned of the applications of geology in the steadying atmosphere of an engineering school. Beginning in 1883 on the

Transcontinental Survey of the Northern Pacific railroad, Mr. Lindgren entered the U. S. Geological Survey the next year, and has thus had nearly thirty years of study in the mining districts of America. Journeys in Australia and Europe have further amplified experience, and courses of instruction given by him at Stanford University and in the Massachusetts Institute of Technology have served to systematize and formulate conclusions. To all has been added a thorough scholarship and spirit of fairness, such that the resulting work is marked by all these characteristics. It is also the ripe fruition of a little school of American observers, whose views have found special expression in the magazine *Economic Geology*.

The book is divisible into two parts. An introductory one of about one fifth the total embraces the general chemical and structural principles on which the remainder is based. The major portion is thus devoted to a review and discussion of the types of mineral deposits whose scheme of classification is at once the climax of the first part and the skeleton of the second. As the title implies, the work takes up "mineral deposits" rather than "ore deposits." The title makes logical and consistent the treatment both of the deposits with the distinctive metals and those with non-metals. It enables the author to have freer scope in that questions of profitable working are less involved. The title is a little over-inclusive for the subject-matter, because coal, our most important mineral deposit, is not mentioned, although a place for it is provided in the scheme of classification. Old associations were probably so strong with our author that coal, petroleum and natural gas faded from the field of view when actually writing.

In the introduction, water necessarily plays a very important part. Six extremely interesting chapters are devoted to it. For the greater number of mineral deposits water is quite correctly regarded as the all-important agent. Its composition, circulation, chemical reactions and amount are all reviewed. The question, may, however, be raised, whether, when the general shallow penetration of the meteoric